

# PATENT SPECIFICATION (11)

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## (54) TOOTHBRUSH

(71) I, HERBERT MAKOWSKY, a German citizen of Wielandstrasse 25, 28 Bremen, West Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—  
 This invention relates to a toothbrush.

According to one aspect of the invention there is provided a toothbrush comprising two bristle carriers pivotally mounted on a handle, a slide mounted on the handle for sliding movement along the handle and flexible traction and thrust transmitting members each formed integrally with one of the bristle carriers and with the slide, so that the bristle carriers are simultaneously pivotable by moving the slide slidably along the handle.

According to another aspect of the invention there is provided a toothbrush comprising two bristle carriers pivotally mounted on a handle, a slide mounted on the handle for sliding movement along the handle and flexible traction and thrust transmitting members connecting the slide to the bristle carriers so that pivotal movement of the bristle carriers between an aligned position in which they extend perpendicularly to the handle and a parallel position in which they are substantially parallel to the handle can be brought about by moving the slide slidably along the handle, the traction and thrust transmitting members being formed integrally with the bristle carriers.

Preferably the traction and the thrust members, the bristle carrier and the slide are formed of plastics material by a single injection moulding operation, in the interest of simple and economical manufacture of the toothbrush.

Further preferred features of the invention include the design and arrangement of the slide, as well as the connection of the bristle carriers with the handle.

Embodiments of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a front elevation view of a toothbrush according to the present invention

showing bristle carriers of the toothbrush in one operative position thereof;

Figure 2 is a front elevation view similar to Figure 1, but showing the bristle carriers in another operative position;

Figure 3 is a view partly in side elevation and partly in longitudinal section of the toothbrush of Figures 1 and 2;

Figure 4 is a view in cross section along the line IV-IV of Figure 2 to an enlarged scale;

Figure 5 is a view in cross section along the line V-V of Figure 3 to an enlarged scale;

Figure 6 is a rear elevation view of a part of a modified form of toothbrush showing the manner in which the bristle carriers are fastened to the handle;

Figure 7 is a view similar to Figure 6 of a further modified form of toothbrush and,

Figure 8 is a view in cross section along the line VIII-VIII of Figure 7.

Referring to Figures 1 to 3, two arcuate bristle carriers 10 and 11 which are mirror images of each other are pivotally mounted on a handle 12 by means of respective pivots 13 and 14. The bristle carriers 10 and 11 can be pivoted between the positions shown in Figure 1 in which they extend laterally on opposite sides of the handle, and the positions shown in Figure 2 in which the bristle carriers 10 and 11 have been pivoted through 90° each and extend away from the handle generally longitudinally thereof. The two different positions of the bristle carriers 10 and 11 correspond to the positions required for optimum dental care for the purpose of cleaning certain portions of the teeth.

The movements of the bristle carriers 10 and 11 are brought about by means of a slide 15. Slide 15 is slidably movable on handle 12, in the longitudinal direction of the latter and can be slid manually by the hand that holds the toothbrush.

The movements of slide 15 are transmitted to the bristle carriers 10 and 11 via flexible elastic traction and thrust transmitting members 16 and 17. The traction and thrust transmitting members 16, 17 are connected with the bristle carriers 10 and 11 at rounded-off front ends 18 and 19, which

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face each other, in a region remote from slide 15. The traction and thrust transmitting members 16, 17 are flexible at least in the region of the front ends 18 and 19 thereof. The elastic material of the members 16, 17 is selected so that traction forces (i.e. forces tending to place the members 16 and 17 in tension) can be absorbed and transmitted to the bristle carriers 10 and 11 when these are pivoted from the position of Figure 1 into the position of Figure 2 by means of the slide and so that the members 16, 17 will transmit thrust forces (i.e. forces tending to compress the members 16 and 17 longitudinally) from the slide 15 to the bristle carriers 10 and 11, to pivot the bristle carriers 10 and 11 from the position of Figure 2 to that of Figure 1.

In the example illustrated, the traction and thrust transmitting members 16 and 17 are formed by a longitudinally split extension of a thrust rod 20, which extension thus provides two portions, one for each of the bristle carriers 10 and 11.

The slide 15, the thrust rod 20, the traction and thrust transmitting members 16 and 17, as well as the bristle carriers 10 and 11, comprise a single integral work piece preferably formed of synthetic plastics material in a single injection moulding operation, this work piece being connected with handle 12 during manufacture by simple assembly measures, that is, by pressing the work piece onto the handle. This facilitates not only the production of the individual parts but also their assembly.

Slide 15 is retained on the handle by means of lateral dovetailed guides 21 and 22 (see Figure 5) which embraces a complementary dovetail section rib extending longitudinally on the handle. The properties of the material (for example, nylon) of slide 15 make it possible, during assembly, to press slide 15, laterally with respect to the handle, over the dovetail rib on the handle, but assembly can also be accomplished by sliding the slide longitudinally over the dovetail rib on the handle.

Slide 15 is provided with a backstop 24 which can be swung around a shaft 23 to fix the bristle carriers 10 and 11 in their positions shown in Figure 1 or their positions shown in Figure 2. For this purpose there are provided on handle 12 two stops 25 and 26 which are spaced from each other and which, in the example illustrated, are constituted by the terminal edges of a depression 27 in the handle 12 the depression 27 being provided by a notch in the dovetail rib. In the position of Figure 2, by swinging the backstop 24, one can move the backstop's edge 28 against stop 25 while in the position of Figure 1 the backstop can be swung to bring its edge 29 against stop 26 so that it will come to rest there. The bristle carriers

10 and 11 are thus prevented from pivoting towards the position of Figure 2 if locked in the position of Figure 1 by the backstop and are prevented from pivoting towards the position of Figure 1 if locked in the position of Figure 2 by the backstop. The bristle carriers 10 and 11 are prevented from moving further towards each other than in the position of Figure 1, and further away from the position of Figure 1 than the position of Figure 2 by the lengths dimensions and resilience of the traction and thrust transmitting members 16 and 17 which do not permit movement beyond the adjusted terminal positions.

Thrust rod 20, whose cross section decreases in the direction of the bristle carriers 10 and 11, is guided by a dovetail rib on the rod 20 on the side thereof facing toward handle 12 fitted slidably within a complementary dovetail groove 30 in handle 12 in order to increase stability of the rod 20 during the transmission of the thrust forces. Furthermore, the interval between front ends 18 and 19 of bristle carriers 10 and 11 is kept to a minimum in order to achieve as uniform a distribution as possible of the bristles 31 carried by the bristle carriers 10 and 11 and to assure the traction and thrust transmitting members 16 and 17 of a certain lateral articulation.

Backstop 24 is mounted integrally together with slide 15 in one injection moulding operation and at the same time is pivotally connected with slide 15 by means of plastics shaft 23 so that only two pieces, one of which is the handle 12, are involved in the complete toothbrush assembly.

Pivots 13 and 14 for the bristle carriers 10 and 11 are so designed that they can easily be assembled by machine. In the embodiment of Figure 6, pins 32 and 33 extend from the sides of the bristle carriers 10 and 11 remote from the bristles 31. These pins pass through holes 34 and 35 in handle 12. Pins 32 and 33 are provided with transversely elongated heads 36 and 37. The holes 34 and 35, through which heads 36 and 37 are inserted during assembly, are also elongated transversely and are so oriented that when the toothbrush is being used, heads 36 and 37 will never be in complete alignment with holes 34 and 35 regardless of the position of bristle carriers 10 and 11.

In the embodiment of Figures 7 and 8, pins 38 and 39 are provided on the bristle carriers 10 and 11 respectively which pins pass through circular holes 40 and 41 in handle 12 and are fixed by circular heads 42 and 43. Heads 42 and 43 are elastically designed in such a manner that they can be pressed through holes 40 and 41 during assembly while being elastically deformed. If necessary, a release slit 44 may be provided in handle 12 which, during assembly, allows the holes

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40 and 41 to widen temporarily as the heads are pushed therethrough. Heads 42 and 43 in the assembled state are preferably recessed into handle 12, as shown in Figure 8.

5 The toothbrush described can be modified in various ways. In particular, it is possible to have other designs for the pivotal connection between bristle carriers 10 and 11 and handle 12. Moreover, the toothbrush can  
10 also be designed so that it can be made as a single, integral work piece in one injection moulding step. In this case, slide 15 is made longer at its ends remote from the bristle carriers 10 and 11 and is connected with the  
15 lower end of handle 12 by a flexible strip which permits relative motion between the slide and the handle. During production of the toothbrush by injection moulding, these parts are moulded end to end, in the longitudinal direction, connected by the strip and  
20 subsequently the integral work piece is bent at said strip and the slide 15 pressed onto the handle.

#### WHAT I CLAIM IS:—

25 1. A toothbrush comprising two bristle carriers pivotally mounted on a handle, a slide mounted on the handle for sliding movement along the handle and flexible traction and thrust transmitting members each  
30 formed integrally with one of the bristle carriers and with the slide, so that the bristle carriers are simultaneously pivotable by moving the slide slidably along the handle.

35 2. A toothbrush comprising two bristle carriers pivotally mounted on a handle, a slide mounted on the handle for sliding movement along the handle and flexible traction and thrust transmitting members connecting the slide to the bristle carriers  
40 so that pivotal movement of the bristle carriers between an aligned position in which they extend perpendicularly to the handle and a parallel position in which they are substantially parallel to the handle can be  
45 brought about by moving the slide slidably along the handle, the traction and thrust transmitting members being formed integrally with the bristle carriers.

50 3. A toothbrush according to claim 1 or 2, wherein the traction and thrust transmitting members, the bristle carriers and the slide member have been formed of plastics material by a single injection moulding operation.

55 4. A toothbrush according to claim 1, 2 or 3, wherein the traction and thrust transmitting members are tapered toward the bristle carriers.

60 5. A toothbrush according to any one of the preceding claims wherein the traction and thrust transmitting members are connected

to the bristle carriers at locations remote from the slide.

6. A toothbrush according to claim 2 or any one of claims 3 to 5 when read as  
65 appendant to claim 2, wherein the adjacent ends of the bristle carriers each have a rounded contour and the traction and thrust transmitting members follow these contours when the bristle carriers are in the aligned  
70 position.

7. A toothbrush according to claim 2 or 6 or any one of claims 3 to 5 when read as  
75 appendant to claim 2, wherein the bristle carriers, in each of said positions are restrained from rotation further away from their other positions by the dimensions and consequent stiffness of the traction and thrust transmitting members.

8. A toothbrush according to claim 2, 6  
80 or 7 or any of claims 3 to 5 when read as appendant to claim 2, further comprising a catch operable in either of said positions of the bristle carriers to prevent rotation of the  
85 bristle carriers towards their other said positions.

9. A toothbrush according to claim 8, wherein the catch comprises a pivotable  
90 backstop on the slide which may be alternatively engaged with either of opposing ends of a depression in the handle.

10. A toothbrush according to claim 9, wherein the backstop is connected with the  
95 slide by a shaft which is integrally moulded with the slide and the backstop.

11. A toothbrush according to any one of claims 1 to 10, wherein the slide is connected with the traction and thrust transmitting members by a thrust rod, these members being formed by a continuation of the  
100 thrust rod which is split longitudinally to form said traction and thrust transmitting members.

12. A toothbrush according to any one of claims 1 to 11, wherein the spacing between the adjacent ends of the bristle carriers is only slightly greater than the combined  
105 thickness of the traction and thrust transmitting members in this area.

13. A toothbrush according to claim 11, wherein the thrust rod is guided on the  
110 handle by a dovetail insert on the rod slidably accommodated in a complementary dovetail groove in the handle.

14. A toothbrush according to any one of claims 1 to 13, wherein the bristle carriers are pivotally mounted on the handle by means of pins fitted in holes in the handle, the pins being provided with retaining heads.

15. A toothbrush according to claim 14, wherein the holes and the heads are correspondingly transversely elongated and are so  
120 arranged that they are never aligned in normal use of the toothbrush.

16. A toothbrush according to claim 14, wherein the holes are circular and the heads

are deformable and are pressed through the holes during assembly.

5 17. A toothbrush substantially as hereinbefore described with reference to and as shown in Figures 1 to 5 of the accompanying drawings.

10 18. A toothbrush as claimed in claim 17 modified substantially as hereinbefore described with reference to and as shown in Figure 6 of the accompanying drawings.

19. A toothbrush as claimed in claim 17 modified substantially as hereinbefore de-

scribed with reference to and as shown in Figures 7 and 8 of the accompanying drawings.

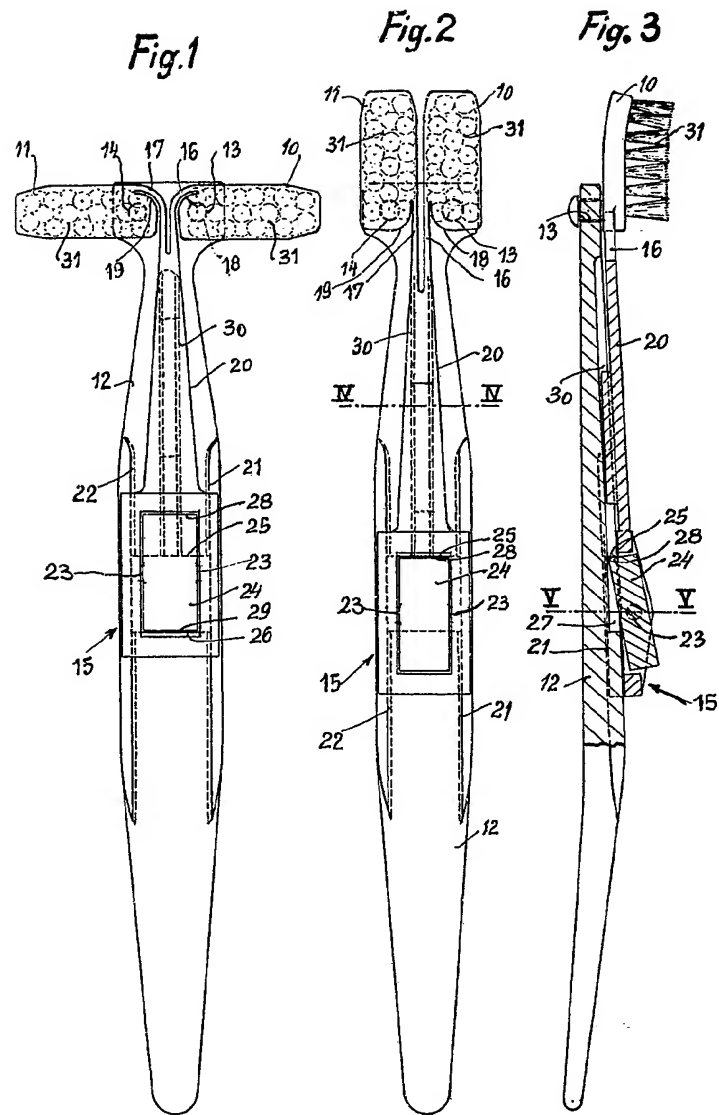
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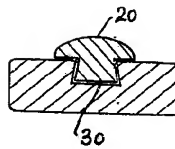
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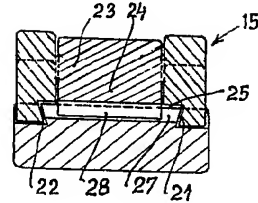
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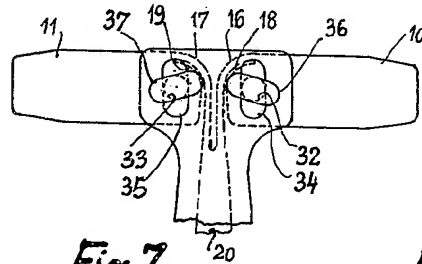
*Fig. 4*



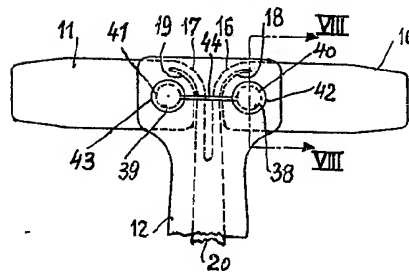
*Fig. 5*



*Fig. 6*



*Fig. 7*



*Fig. 8*

